ENGINEERING REPORT

for

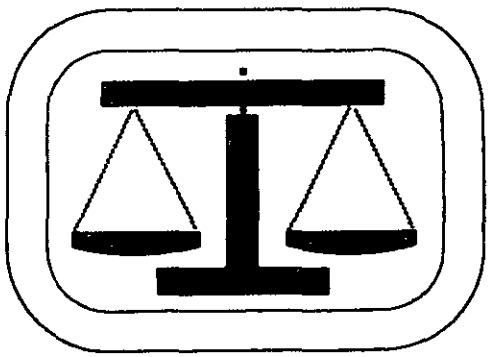
Contract DACW-33-81-D-0005
Work Order Number 0002

Subsurface Investigation

for the

Beaver Brook Design Project

Keene, New Hampshire



BRIGGS

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1.0 GENERAL

1.1 Authorization

The subsurface exploration work for Beaver Brook-Design Project, reported herein was performed under Contract DACW-33-81-D-0005, Work Order No. 0002, dated 22 February 1982. The authority for this project is derived from Section 205 of the 1948 Flood Control Act as amended. The contracting officer is Arthur N. Rappaport, Lt. Col.

1.2 Project Site

The site is located in Keene, New Hampshire, on the east side of Route 10, and approximately 0.6 miles north of the intersection of Routes 9 and 10.

1.3 Purpose and Scope of the Investigation

The subsurface information obtained from the exploration program is required to plan the foundation design and construction of a concrete overflow dam at the site. The proposed dam will vary in height from 8 to 15 feet. An earth filled dike will be constructed adjacent to and parallel to Route 10.

The exploration program consisted of drilling four test borings at the locations shown on the Subsurface Exploration Plan. Borings A, C and D were advanced 15 feet into rock and Boring E was advanced 5 feet into rock. The borings were drilled between 8 March and 16 March 1982 by Briggs Engineering and Testing Company, Inc. of Norwell, Massachusetts. Field exploration logs are included in Appendix A. The borings were located in the field by taping distances from the centerline of Route 10 and the downstream face and westerly end of the existing dam.

2.0 SUBSURFACE CONDITIONS

2.1 Subsurface Materials

The following subsurface materials were encountered when the borings where drilled at the site.

a. Topsoil up to 1.0 ft. in thickness was encountered at the surface.

b. Silty Gravel, aproximately 3 feet in thickness was encountered at a depth of 11 feet in Boring A. About 0.5 feet of silty gravel was encounterd at the surface in Boring C.

c. Glacial Till, consisting of brown and gray slightly plastic, stiff, sandy clays and clayey silts, was encountered in Borings A, B and E. Till was not present in Boring C.

d. Interbedded Biotite Schist and Granite underlies the glacial till. The rock is fresh to slightly weathered and hard. Joints were closely spaced and usually occurred along foliation planes. A 3" clay plane was encountered at a depth of 15.0 in Boring D. Recoveries ranged from 25 to 100%, with most exceeding 90%.

2.2 Groundwater

Groundwater was encountered in all the borings. The water levels were measured upon completion on the borehole. The water levels are summarized on the Subsurface Exploration Logs.

3.0 QUALITY CONTROL

3.1 Equipment

The equipment and type of tools used are described below.

a. Core Drill: The core drill used was a modern hydraulically driven rotory head unit manufactured by Acker Drill Company. The drill rig was mounted on a bombadier.

b. Drive Hammer: The drive hammer used to advance both the casing and solid barrel samplers weighed approximately 300 pounds.

c. Casing and Rods: HW (4 in.) flush joint casing was used to keep the borehole in overburden open. AW drill rods were used in washing out the casing.

d. Samplers: The equipment used to obtain soil samples was the solid barrel sampler type with a ball check head in sizes 2 1/2 and 2 inch ID by 5 ft., with spring type retainers. The equipment used to obtain rock samples was the swivel head double tube NWX core barrel by 5 ft., with a surface mounted diamond bit.

3.2 Records

NED Forms 58 and 58A, dated March 1971 and entitled "Field Log of Test Boring" and NED Form 130, dated December 1960 and entitled "Field Log of Test Boring in Rock" were used to record pertinent drilling and sampling data. The logs include the following:

a. Site location, boring location and number.

b. Make and model of drilling equipment.

c. Type of drilling and sampling operation by depth.

d. Depths at which soil samples or rock cores were recovered, including top and bottom depth of each run. Classification or description of the soil and rock samples obtained. Indication of penetration resistance such as drive hammer blows given in blows per penetration depth for driving sample spoons.

e. Length of sample of soil or rock recovered per sampling run.

f. Depth at which groundwater is encountered.

3.3 Procedures

a. Boreholes were advanced by continuous sampling in which either a 2 1/2 or a 2 inch ID x five foot solid spoon sampler was advanced below the bottom casing into undisturbed soil by the impact of a hammer weighing approximately 300 pounds falling 18 inches. Refusal was defined as 100 blows for no penetration or bouncing refusal.

b. The sample spoon shoes were kept reasonably sharp at all times. Dull, bent, or otherwise damaged samplers were not used. Sampling was accomplished to a depth of not more than five feet below the bottom of the casing, after which the casing was advanced to the previously sampled depth and cleaned out using appropriately sized roller bits and side discharging chopping bits.

c. Upon reaching the top of rock, the borehole was advanced by coring with a swivel head double tube NWX core barrel. Sampling runs did not exceed five feet.

d. Samples were classified in the field immediately following the taking of the sample. Classification was in accordance with ASTM D-2487 and D-2488. Representative samples were take from each soil sampling run and placed in 16 oz. glass jars with hermetically sealed lids. Jars were labeled with sample number, sampling interval, boring number, date, location, penetration resistance and soil description. Rock cores obtained from each coring run were placed in 5 foot wooden core boxes which were labeled with the job location, boring number and depth interval covered by the run. A chain of custody log was maintained documenting custody of the samples between the field and transportation and delivery to the laboratory.

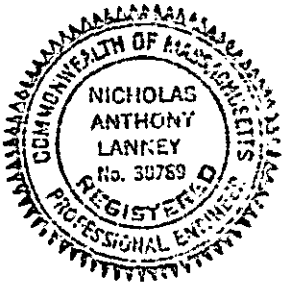
4.0 QUALITY CONTROL CERTIFICATION

I hereby certify that the above mentioned records, equipment and procedures were used to perform the subsurface exploration described herein. I also certify that the work was performed in a professional manner and meets the requirements set forth in the work order.

CERTIFIED 16 APRIL 1982

Nicholas A. Lanney

Nicholas A. Lanney, P.E.
Masschusetts No. 30789



BRIGGS ENGINEERING CORPORATION

Chain of Custody Log

Project: Subsurface Investigation - Beaver Brook

Items: Tubes None

Bottles None

Jar Samples 21

Core Boxes 4

Sampling Logs Borings A, C, D and E

Date & Time Received	Date & Time Transfered	Comments	Custodian
as sampled	3/11/82 0800		Ronald Bub
3/11/82 0800	3/19/82 1500		Nicholas Lamey
3/19/82 1500	3/22/82		Robert T. Pucci
3/22/82 1300	3/22/82		Joseph D. Pucci

BRIGGS ENGINEERING CORPORATION

WEEKLY SAFETY MEETING

TO: Safety Office, NED

FROM: Field Engineer — Date held 9 March 1982

THRU: Project Engineer — Time 0900hrs

Weekly safety meeting was held this date for the following personnel:
Contract No. DACW 33-81-D-0005 Personnel present: R. Jones
Work Order No. 0002 W. Souza
Conducted By: R.F. Bukoski

1. Subjects discussed (Note, delete, or add):

x Individual Protective Equipment -
Prevention of Falls -
x Safe Lifting Techniques -
Emergency Communications -
Fire Prevention -
Sanitation, First Aid -
x Tripping Hazards - trash, hose, nails in lumber -
Staging, Ladders, Concrete Forms -
Hand Tools -
Portable Power Tools -
Woodworking Machinery -
x Equipment Maintenance (Zero defects) -
x Hoisting Equipment -
x Ropes, Hooks, Chains and Slings -
Electrical Grounding, Temporary Wiring -
Lockouts for safe clearance procedures -
Electrical, pressure, moving parts -
Welding -
Excavations -
Loose Rock and Steep Slopes -
Explosives -
Water Safety -
Other -

Prepared by: R.F. Bukoski
Field Engineer

2. Exposure:

No previous exposure, start of new work order

Signature: Nicholas Lannan
Project Engineer

3. Forwarded: NED, Waltham, MA

BRIGGS ENGINEERING CORPORATION

WEEKLY SAFETY MEETING

TO: Safety Office, NED

FROM: Field Engineer

THRU: Project Engineer

Date held 15 March 1982

Time 0900hrs

Weekly safety meeting was held this date for the following personnel:
Contract No. DACW 33-81-D-0005 Personnel present: R. Jones
Work Order No. 0002 W. Souza
Conducted By: N. Lanney

1. Subjects discussed (Note, delete, or add):

x Individual Protective Equipment -
x Prevention of Falls -
x Safe Lifting Techniques -
Emergency Communications -
Fire Prevention -
Sanitation, First Aid -
x Tripping Hazards - trash, hose, nails in lumber -
Staging, Ladders, Concrete Forms -
Hand Tools -
Portable Power Tools -
Woodworking Machinery -
x Equipment Maintenance (Zero defects) -
x Hoisting Equipment -
x Ropes, Hooks, Chains and Slings -
Electrical Grounding, Temporary Wiring -
Lockouts for safe clearance procedures -
Electrical, pressure, moving parts -
Welding -
Excavations -
Loose Rock and Steep Slopes -
Explosives -
Water Safety -
Other -

Prepared by: Nicholas Lanney
Field Engineer

2. Exposure:

For the week ending 8 March 1982, covering 3 men x 43 manhours per man for 126 manhours

Signature: Nicholas Lanney
Project Engineer

3. Forwarded: NED, Waltham, MA

BRIGGS ENGINEERING CORPORATION

WEEKLY SAFETY MEETING

TO: Safety Office, NED

FROM: Field Engineer Date held No meeting held

THRU: Project Engineer Time _____

Weekly safety meeting was held this date for the following personnel:
Contract No. DACW 33-81-D-0005 Personnel present: _____
Work Order No. 0002 _____
Conducted By: _____ _____

1. Subjects discussed (Note, delete, or add):

Individual Protective Equipment -
Prevention of Falls -
Safe Lifting Techniques -
Emergency Communications -
Fire Prevention -
Sanitation, First Aid -
Tripping Hazards - trash, hose, nails in lumber -
Staging, Ladders, Concrete Forms -
Hand Tools -
Portable Power Tools -
Woodworking Machinery -
Equipment Maintenance (Zero defects) -
Hoisting Equipment -
Ropes, Hooks, Chains and Slings -
Electrical Grounding, Temporary Wiring -
Lockouts for safe clearance procedures -
Electrical, pressure, moving parts -
Welding -
Excavations -
Loose Rock and Steep Slopes -
Explosives -
Water Safety -
Other -

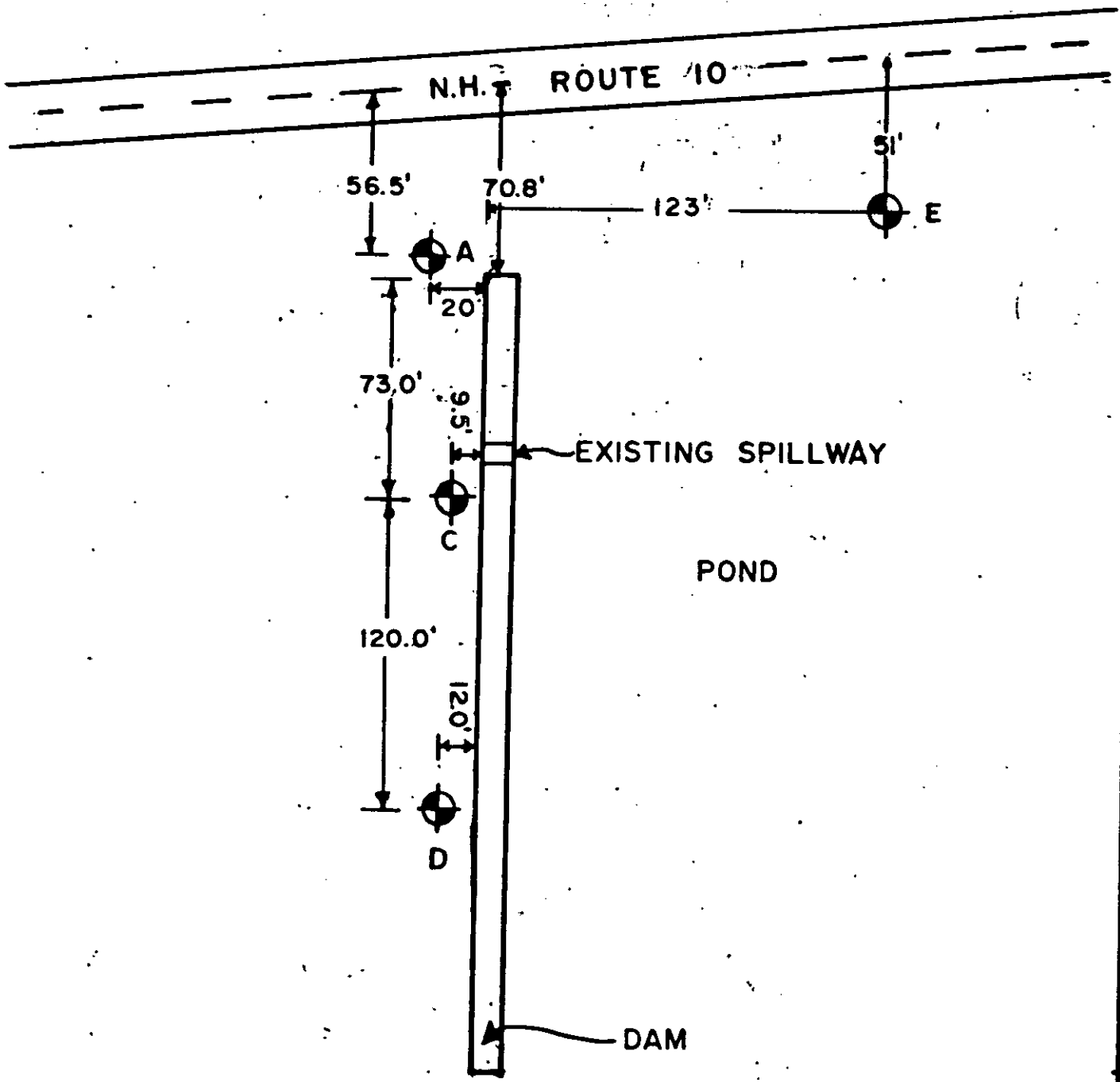
Prepared by: Nicholas A. Lamm
Field Engineer

2. Exposure:

For the period of 15-16 March 1982, covering 3 men x 20 manhours per man for 60 manhours

Signature: Nicholas Lamm
Project Engineer

3. Forwarded: NED, Waltham, MA



EXPLORATION LOCATION PLAN

BRIGGS ENGINEERING & TESTING CO.
NORWELL, MASSACHUSETTS

DR. BY A.E.K.	SCALE 1"=50'	PROJ. NO. 12980
CK'D BY N.A.L.	DATE 3/22/82	FIG. NO. 1

U. S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION **FIELD LOG OF TEST BORING**	Site Beaver Brook Page 1 of 5 Pages Boring No. A Desig. FD-82-3 Diam. (Casing) 4" Co-ordinates: N NOT AVAILABLE E

Elevation Top of Boring	789.4 M.S.L.	Hammer Wt.	300
Total Overburden Drilled	14 Feet	Hammer Drop	18
Elevation Top of Rock	775.4 M.S.L.	Casing Left	0
Total Rock Drilled	15 Feet	Subsurface Water Data	4.5' below grade
Elevation Bottom of Boring	760.4 M.S.L.	Obs. Well	NONE
Total Depth of Boring	29 Feet	Drilled By	Briggs Engineering
Core Recovered	86 % No. Boxes 1	Mfg. Des. Drill	Acker - Bombodier
Core Recovered	14 Ft: NX Diam. 2 1/8 In.	Inspected By:	N A Lanney
Soil Samples	2 In. Diam. 7 No.	Classification By:	NA Lanney
Soil Samples	In. Diam. No.	Classification By:	

Boring Started 3-12-82
Boring Completed 3-15-82

3/12/82
1130HRS

DEPTH	1" = 2	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1'		1	2"	0 – 1'	11	Drove 2" solid spoon sampler from 0' to 5' and recovered 18"	TOPSOIL
	2	1A 2 jars	2"	1 – 5'	44, 17, 30, 44	Drove 4" casing to 5' and washed out casing with 3" roller bit	SANDY SILT, slightly to non-plastic, 10-20% fine sand, gray, stiff, damp, (ML).
9'	4, 6, 8	2 2 jars	2"	5 – 9'	15, 20, 32, 47	Drove 2" solid spoon sampler from 5 to 9.5' and recovered 2'-4". Bouncing refusal at 9.5'. Drove 4" casing from 5 to 10' and washed casing with 4" roller bit. Could not roller bit past 10.0'	SANDY CLAY, slightly plastic, 10-20% coarse to fine sand, stiff, gray, wet, (CL).
	10	2A	2"	9 – 9.5'	100/6"		

1205

GENERAL REMARKS:

Site: Beaver Brook Keene NH

Boring No. A FD-82-3

Blows on Casing	Depth ft. 2'	Core/Sample No.	Size	Depth Range	Blows per ft. / Core Rec'v'y	Sampling and Coring Operations	Classification of Materials
	10		NX	10' 11'	6"	Cored from 10' to 11' with NX double tube ~~barrel and recovered 6"~~	Cored Cobble and recovered 6"
	12	3 1/2 yr	2"	11 13.5	45 70 125/6"	Cored cobble. Drove 2" solid barrel sampler from 11.0 to 13.5'. Bouncing refusal at 13.5. Recovered 20". Cored through boulder with roller bit + drove 4" casing to 14.0	SILTY GRAVEL, coarse to fine subangular gravel to 2" max, 20-25% coarse to fine micaceous sand, 15-20% nonplastic fines, gray, (GM).
3-15-82	14					Refusal at 14'	TOP OF ROCK AT 14'
		1	NX	14 15'	0	Cored from 14' to 15' with NX double tube barrel and recovered nothing	
	16 / 18	2	NX	15 20'		Cored from 15 to 20' with NX double tube barrel and recovered 60"	BIOTITE SCHIST, foliated, fresh to slightly weathered, hard, medium to coarse grained, dark gray 15.8 foliation plane jt 16.7-17 qtz vein 17.5 foliation plane jt 18.0 Jt w/ qtz coating 19.0 Foliation pl. joint 19.4 Jt w/ qtz coating
	20 / 22 / 24	3	NX	20 25'		Cored from 20 to 25' with NX double tube barrel and recovered 60"	21.0 Foliation pl. joint 22.75 Foliation plane jt

Site: Beaver Brook Keene, NH	Boring No. AFD-82-3	Page 3 of 5

DEPTH: Blows on Casing	DEPTH: r = 2'	CORE/SAMPLE: NO.	CORE/SAMPLE: SIZE	CORE/SAMPLE: DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	26	4	NX	25 – 29		Cored from 25 to 29 with NX double tube barrel and recovered 48"	
	28						
	30					End of Boring at 29.0'	

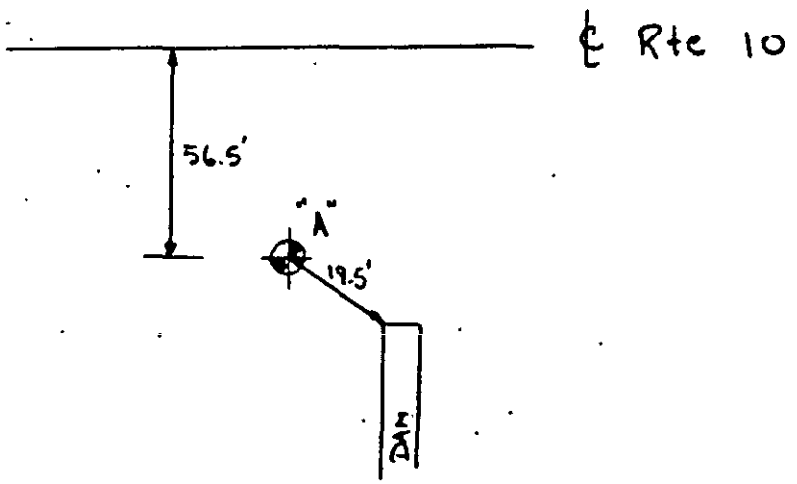
Site: KEENE NH
Boring No: A (FD-82-3)

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
3/15/82	0900	14	14	4.5'	784.9	

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



FIELD LOG OF TEST BORING IN ROCK

SITE BEAVER BROOK ROLE NO. A (CFD-82-3) PAGE 5/5

DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN PT.	RUN REC'V'Y PT.	REC'V'Y %	DRILLING BEHAVIOR: FEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR PULL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
3/12/82	10	11	1	0.5	50%		NO WATER LOST			NX	
3/15/82	14	15	1	0	0					NX	
	15	20	5	5'	100%			FULL BARREL		NX	
	20	25	5	5	100%			" "		NX	
	25	29	4	4	100%			END OF BORING		NX	

TOTAL BED ROCK DRILLED 16 FEET

TOTAL BED ROCK RECOVERED 14 FEET

BED ROCK RECOVERY 86 PERCENT

DRILLER RICHIE JONES

INSPECTOR NICHOLAS LANNEY

NED FORM DEC 63 130

REPLACES EDITION OF APR 49 WHICH MAY BE USED UNTIL EXHAUSTED

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site BEAVER BROOK, KEENE, NH Page 1 of 5 Pages

Boring No. FD-82-1 Desig. C&S-1 Diam. (Casing) 4.0"

Co-ordinates: N NOT AVAILABLE E

Elevation Top of Boring 783.1 M.S.L.
Total Overburden Drilled 4.5 Feet
Elevation Top of Rock 778.6 M.S.L.
Total Rock Drilled 15.0 Feet
Elevation Bottom of Boring 763.6 M.S.L.
Total Depth of Boring 19.5 Feet
Core Recovered 91 % No. Boxes 1
Core Recovered 13.7 Ft : NX Diam. 2 1/16 In.
Soil Samples 2" In. Diam. 3 No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. 300 lb Boring Started 3-9-82
Hammer Drop 18 in. Boring Completed 3-10-82
Casing Left 0
Subsurface Water Data at ground surface
Obs. Well NONE
Drilled By Boyce Engineering
Mfg. Des. Drill Acker - Track Mounted
Inspected By: Ronald F. Bukocki
Classification By: Ronald F. Bukocki (N. Lonney)
Classification By: ____

DEPTH Blows on Casing	DEPTH 1° / 1'	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
15		S-1 1 of 1	2.0"	0.0 TO 0.5'	10	DROVE 2.0" ID x 5.0' SOLID SPOON SAMPLER FROM GROUND SURFACE TO 4.5' USING 300 lb HAMMER DROPPED 18". BOUNCING REFUSAL AT 4.5'. RECOVERED APPROXIMATELY 13".	SURFACE: SURFACE FEATURES OBSCURED BY 30" OF SNOW. DEPTH OF WATER AT BORING LOCATION WAS 1.2' BENEATH ICE AND SNOW. SEVERAL LARGE COBBLES WERE VISIBLE IN WATER AT BORING LOCATION.
46	1	S-1A 1 of 1	2.0"	0.5'	36	DROVE 4.0" CASING FROM GROUND SURFACE TO 4.5' AT WHICH POINT BOUNCING REFUSAL WAS ENCOUNTERED.	S-1: SILTY GRAVEL, COARSE TO FINE SUBANGULAR GRAVEL, 15-25% COARSE TO FINE SAND, 5-15% NON PLASTIC FINES, SATURATED, BROWN, (GM-GP).
49	2			3.0'	11	PROBE ATTEMPTED 2' FROM CASING TOWARD DAM CENTER LINE USING "AN" DRILL RODS. DRIVE RODS TO REFUSAL	S-1A: DECOMPOSED SCHIST, HIGHLY MICACEOUS, GOLDISH BROWN.
48	3	S-1B 1 of 1	2.0"	3.0'	44	AT 5.5'. ASSUMED TOP OF ROCK AND CORING OPERATIONS WERE STARTED FOLLOWING THE WASHING OUT OF THE CASING USING A ROLLER ROCK BIT.	S-1B: HIGHLY WEATHERED SCHIST, 2" SEAM OF GRAVELLY SILT OVERLYING, LOW PLASTICITY, 20-30% FINE SUBROUNDED GRAVEL. GRAY, (ML), MICACEOUS SCHIST, THIN LAYERS OF QUARTZ TO 1/2" THICK, GRAY.
52	4			4.5'	25/0.5'		
	5						

GENERAL REMARKS: BLOWS ON CASING FOR 300 lb HAMMER DROPPED 24 in.

DEPTH: Blows on Casing	DEPTH: Ft.	CORE/SAMPLE: No.	CORE/SAMPLE: Size	CORE/SAMPLE: Depth Range	BLOWS PER FT. / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	6, 7	1	NX	4.5' to 7.5	30"	Cored with NX double tube barrel from 4.5 to 7.5' and recoverd 30"	SCHIST, gray, micoceous, fresh to slightly weathered, hard, medium to coarse grained 5.6 - 5.75 fractured zone 6' foliation plane jt 6.1-6.3 fractured zone 6.5 foliation plane jt
	8, 9, 10, 11, 12	RUN 2	NX	7.5' to 12.5'	60"	Cored with NX double tube barrel from 7.5' to 12.5' and recovered 60"	9' foliation plane jt 9.3' " " " 9.8' " " " 10.2' " " " 12.3' foliation plane jts 12.5-13 highly fractured zone
	13					Cored with NX double tube barrel from 12.5' to 17.5' and recovered 56"	

Site: Beaver Brook Dam
Keene NH

Boring No. FD 82-1

DEPTH: Blows on casing	DEPTH: r = 2'	CORE/SAMPLE: No.	CORE/SAMPLE: Size	CORE/SAMPLE: Depth range	Blows per ft. / Core recv'y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	13						13.25' Foliation plane jt
	14	Run 3	NX	12.5 to 17.5'	60"		14.25' Foliation plane jt 14.75' " " "
	15						
	16						16' Foliation plane jt 16.25' " " "
	17						
	18	Run 4	NX	17.5 to 19.5	18"	Cored with NX double tube barrel from 17.5' to 19.5' and recovered 18"	17.5-19.5' Fractured zone
	19						
	19.5					End of Boring at	19.5'
	20						

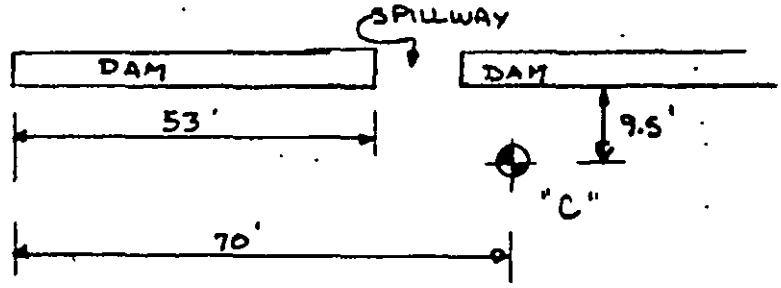
Site: BEAVER BROOK
Boring No: C (FD-82-1)

SUBSURFACE WATER OBSERVATIONS 4/5

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
3/10/82	0700	4.5	12.5	0'	783.1'	

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



NED FORM 59 MAR 71 (Test)

Boring No. C

FIELD LOG OF TEST BORING IN ROCK

SITE BEAVER BROOK ROLE NO. C CFD-82-1) PAGE 5/5

DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR: FEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR PULL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
3/9/82	4.5	7.5	3	2.5	83		NO WATER LOST	JAMMED BARREL		NX	
	7.5	12.5	5	5	100			FULL BARREL		NX	
3/10/82	12.5	17.5	5	5	100			" "		NX	
	17.5	19.5	2	1.5	75			END OF BORING		NX	

TOTAL BED ROCK DRILLED 15 FEET

TOTAL BED ROCK RECOVERED 14 FEET

BED ROCK RECOVERY 93 PERCENT

DRILLER RICHIE JONES

INSPECTOR NICK LANNEY

NED FORM DEC 63 130

REPLACES EDITION OF APR 49 WHICH MAY BE USED UNTIL EXHAUSTED

U.S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site Beaver Brook Dam — Page 1 of 4 Pages

Boring No. FD-82-2 Desig. FD Diam. (Casing) 4"

Co-ordinates: N Not Available E

Elevation Top of Boring 788.95 M.S.L.
Total Overburden Drilled 5.5 Feet
Elevation Top of Rock 783.45 M.S.L.
Total Rock Drilled 15 Feet
Elevation Bottom of Boring 768.45 M.S.L.
Total Depth of Boring 20.5 Feet
Core Recovered 94 % No. Boxes 1
Core Recovered 14 Ft. NX Diam. 2 1/8 In.
Soil Samples 2" In. Diam. 3 No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. 300 Boring Started 3-11-82
Hammer Drop 18" Boring Completed 3-12-82
Casing Left 0
Subsurface Water Data 2.75' below grade
Obs. Well NONE
Drilled By Briggs Engineering
Mfg. Des. Drill Acker Bombadier
Inspected By: NA Lanney
Classification By: NA Lanney
Classification By: ____

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0.5	1	2"	0 0.5	3	Drove 2" solid spoon sampler from 0 to 3.5'. Refusal at 3.5' Recovered 18".	TOPSOIL
	1A	2	0.5 3.5	3 8 20	Moved hole 6" and drove 4" casing to 4.5' and washed out casing with 3" roller bit	SANDY SILT, slightly plastic, ~0-25% sand, few roots, brown, saturated
4.5	2	2"	4.5 5.5	33 75	Drove 2" solid spoon sample from 4.5 to 5.5'. Refusal at 5.5'. Recovered 6"	SICTY CLAY slightly plastic, 10-20% fine sand and mica flakes gray-brown saturated (CL)
5.5					TOP OF ROCK AT 5.5'	
	Run 1	NX	5.5 8.5		Cored from 5.5 to 8.5' with NX double tube barrel and rec. 36"	GRANITE, light gray, sound, very hard, fine-grained 6.6 30° joint
	Run 2	NX	8.5 9.5		Cored from 8.5 to 9.5 with NX double tube barrel and recovered 8"	9.0' Rust stn. joint
10						

GENERAL REMARKS:

Site: Beaver Brook, Keene NH	Boring No. FD-82-2	Page 2 of 4

Depth: Blows on Casing	Depth: Ft. 2'	Core/Sample No.	Size	Depth Range	Blows per Ft. / Core Recvy	Sampling and Coring Operations	Classification of Materials
11	11.0	Run 3	NX	9.5'–14.5'		Cored from 9.5 to 14.5 with double tube NX Core barrel and recovered 60"	Interbedded GRANITE G[illegible] and BIOTITE SCHIST, foliated, fresh, hard medium to fine grained.
	12						11.0 joint
	14						11.7 foliation plane jt 12.0 clay coated jt 12.5 " " "
		4	NX	14.5–15.5		Cored from 14.5 to 15.5 with double tube NX core barrel and recovered 11"	12.7 rust std jt. 13.0 clay coated jt 14.3 jt
	16						15.25-15.5 clay seam
		5	NX	15.5–20.5		Cored from 15.5 to 20.5 with NX double tube barrel Recovered 58	16.5-17 Highly fractured zone
	18						19.25 Clay coated jt 19.75 " " "
	20						
	22					End of Boring at 20.5'	

0905

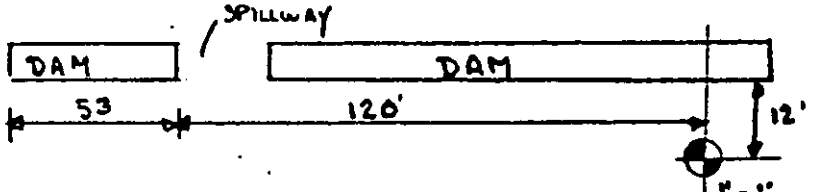
Site: BEAVER BROOK
Boring No: D (FD-82-2)

SUBSURFACE WATER OBSERVATIONS 3/4

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
3-12-87	0730	5.5	9.5	2.75	786.2	

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



FIELD LOG OF TEST BORING IN ROCK

SITE BEAVER BROOK ROLE NO. DCFD-82-2) PAGE 4/4

DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR FEED	DRILLING BEHAVIOR WATER	DRILLING BEHAVIOR REASON FOR POLL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
3/11/82	5.5	8.5	3	3	100		NO WATER LOST	BIT NOT CUTTING		NX	
	8.5	9.5	1	0.25	25			END OF DAY			REPLACED BIT
3/12/82	9.5	14.5	5	5	100			FULL BARREL			
	14.5	15.5	1	0.92	92			BARREL DROPPED			CLAY SEAM AT 15.25-15.5
	15.5	20.5	5	4.8	97			FULL BARREL			

TOTAL BED ROCK DRILLED 15 FEET

TOTAL BED ROCK RECOVERED 13.97 FEET

BED ROCK RECOVERY 93 PERCENT

DRILLER RICHIE JONES

INSPECTOR NICK LANNEY

NED FORM DEC 63 130

REPLACES EDITION OF APR 60 WHICH MAY BE USED UNTIL EXHAUSTED

U.S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site Beaver Brook — Page 1 of 4 Pages

Boring No. FD-82-4 Desig. [illegible] Diam. (Casing) 4"

Co-ordinates: N NOT AVAILABLE

Elevation Top of Boring 790.9 M.S.L.
Total Overburden Drilled 14 Feet
Elevation Top of Rock 776.9 M.S.L.
Total Rock Drilled 5 Feet
Elevation Bottom of Boring 771.9 M.S.L.
Total Depth of Boring 19 Feet
Core Recovered 100 % No. Boxes 1
Core Recovered 5 Ft : NX Diam. 2 1/8 In.
Soil Samples 2 1/2 In. Diam. 3 No.
Soil Samples 2 In. Diam. 5 No.

Hammer Wt. 300
Hammer Drpp 18"
Casing Left 0
Subsurface Water Data 4.5' below grade
Obs. Well NONE
Drilled By Briggs Engineering
Mfg. Des. Drill Acker - Bombadier
Inspected By: N A Lanney
Classification By: N A Lanney
Classification By:

Boring Started 3-15-82
Boring Completed 3-16-82

DEPTH in Ft.	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0	1	2 1/2	0	4	Drove 2 1/2" solid barrel sampler from 0 to 5' and recovered 30"	TOPSOIL
1			1			
2	RA	2 1/2	1	17		SANDY CLAY, slightly plastic, 20-30% fine sand, olive gray, stiff (CL) GLACIAL TILL
				23		
4	2 pcs		5'	25		
				32		
6	2	2	5	11	Drove 2" solid barrel sampler from 5' to 10' and recovered 30". Drove 4" casing to 10' and washed out casing with 3 1/2" chopping bit	SANDY CLAY slightly plastic 30-40% coarse to fine sand, 5-10% gravel, olive-gray, stiff (SC-CL) GLACIAL TILL
	3 & 6		10'	19		
8				27		
				33		
10				49		

GENERAL REMARKS:

Site: Beaver Brook
Keene NH

Boring No. FD-82-4 E

Page 1 of 4

DEPTH (Drive or Coring)	DEPTH (ft. ± 2')	CORE/SAMPLE No.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	10			10	14	Drove 2" solid barrel sampler from 10 to 14' and took sample Recovered 24". Drove 4" casing to 13.5' and washed out casing with chopping bit	CLAYEY SILT, slightly to non-plastic, 10-20% sand 5-8% gravel stiff, dark gray (CL-GL) GLACIAL TILL
	12	S3 2 jars	2"	14'	40		
					47		
					130		
	14						TOP OF ROCK AT 14'
		Run 1	N X	14 19'		Cored from 14' to 19' with NX double tube barrel and recovered 60".	GRANITE, slightly weathered, hard, fine grained, clay filled joints 14-14.5 fractured zone 15.5-16, 18.5-17 fractured zones 17.75 joint 18.0 joint 18.5, 19 joints
	16						
	18						BIOTITE: fresh, hard, foliated
						END OF BORING AT 19'	
	20						

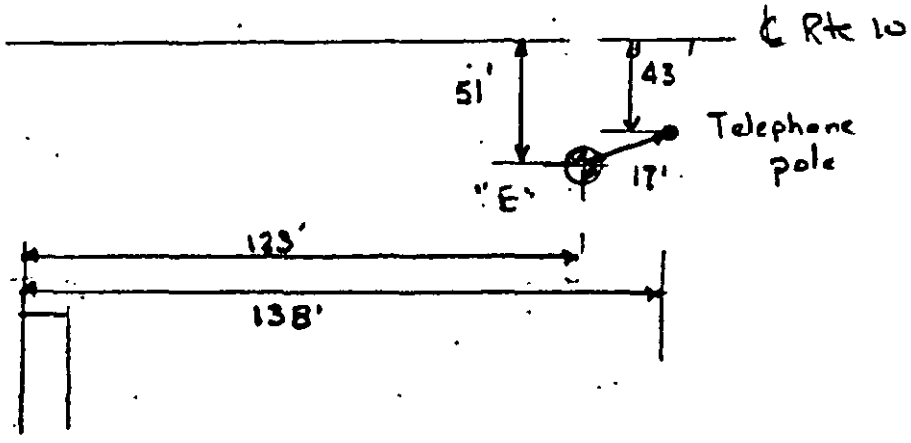
Site: BEAVER BROOK
Boring No: E (FD-82-4)

SUBSURFACE WATER OBSERVATIONS 3/4

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
3/16/82	0700	5	10	4.5	786.4	

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



FIELD LOG OF TEST BORING IN ROCK

SITE BEAVER BROOK HOLE NO. E (FD-82-4) PAGE 4/4

DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR: FEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR PULL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
3-16-82	14	19	5	5	100		NO WATER LOST	END OF BORING		NX	

TOTAL BED ROCK DRILLED 5 FEET

TOTAL BED ROCK RECOVERED 5 FEET

BED ROCK RECOVERY 100 PERCENT

DRILLER RICHIE JONES

INSPECTOR NICK LANNEY

NED FORM DEC 63 130

REPLACES EDITION OF APR 60 WHICH MAY BE USED UNTIL EXHAUSTED